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PACKET RADIO

MAGAZINE

Dedicated to the Advancement of Packet Radio

PRM NOW INCLUDES THE

TAPR PACKET STATUS REGISTER

WELCOME ABOARD

TAPR MEMBERS

es: DEC 86

Pac-Comm DR-100 and DR-200
Packet Repeater Controllers

The Pac-Comm DR-100 and DR-200 are single-port and dual-port digital repeater (digipeater) controllers designed expressly for packet radio network uses. They are specifically configured for use at remote, unattended locations and are optimized to isolate the digital circuitry from the RF and weather conditions typically found at those sites.

HARDWARE

Both units use the Z-80 processor running at 2.4576 Mhz. There is provision for up to 32k bytes of EPROM and up to 32k bytes of RAM. The RAM has a long-life lithium back-up battery. The cpu "watchdog" timer will reset the processor in the event of software failure. The processor's RESET line is brought out for external control. The DR-200 has a Z-80 CTC to handle dual-port interrupts and scheduling functions. Both models use the 8530 Serial Communications Controller for HDLC functions. This VLSI chip has two independent, full-duplex packet ports supporting internal encoding and decoding of NRZI data without the use of state machines. The standard modem is a 7910 integrated modem chip usuable at either 300 or 1200 bauds. Each port has an individual time-out timer for the radio PTT keying line. External high-speed modems can be connected to the DR-series controllers through standard modem disconnect headers.

Two methods are available for asynchronous serial communications with the DR-series controllers. The DR-100 uses the 8530's second port to provide TTL-level signals to an on-board connector. A TTL-to-RS232 adapter cable is available from Pac-Comm for this port. The TTL port is intended for temporary attachment of a terminal during setup and maintenance, and can also be used for permanent connection of a telephone modem, weather station or any serial data device. This same port is available on the DR-200, but its use disables one of the RF channels. If this is undesireable, an RS232 serial daughterboard is available for setup and maintenance. If needed, the daughterboard may remain permanently in place.

CABINETRY

The DR-series controllers are housed in a new extruded aluminum case externally identical to the TNC-200 case. Internally, there is a set of circuit board mounting rails in the upper portion of the case which can be used for accessory devices. The cabinet end plates provide metal-to-metal contact for an rf-tight seal. All external connections are soldered to feedthroughs mounted in the end plates.

SOFTWARE

Several software modules are available for the DR-series controllers. The 'KE3Z Dual Port Digipeater' written by Jon Bloom has been adapted to the DR-200. It uses an explicit routing and/or default SSID routing scheme. N2WX Level 3 code written by Howie Goldstein is also available. This program implements a virtual circuit packet switch. Both programs use the second port to support a network backbone channel which moves LAN-to-LAN packets on a seperate frequency, lessening the mutual interference found in single frequency networks. The DR-100 runs either the single port version of N2WX Level 3 or standard AX.25 Level 2 Version 2 digipeater software based on the TNC-200 program. One software choice is included, additional EPROMs are available at extra cost.

AMATEUR NET PRICE SCHEDULE

	KIT	ASSEMBLED
DR-100 SINGLE PORT	$ 79.95	$ 99.95
DR-200 DUAL PORT	$ 139.95	$ 159.95
TTL-TO-RS232 CABLE		$ 19.95
RS232 DAUGHTERBOARD		$ 39.95

Pac-Comm Packet Radio Systems, Inc.
3652 W. Cypress Street, Tampa, FL 33607
(813) 874-2980

Subscriptions to PACKET RADIO MAGAZINE are available through any of the participating organizations listed below. See individual club pages in this issue for information on how to contact these organizations. If there is no participating group in your area, you are encouraged to join FADCA or TAPR. FADCA membership dues (US Dollars): United States = $15.00, Canada = $18.00, Foreign (airmail) = $25.00. Three dollars of each member's dues is allocated for FADCA operations, and the remainder is for the subscription to PRM. Major clubs wishing to participate in PRM should contact the FADCA office.

PARTICIPATING ORGANIZATIONS

ALA-NET – Alabama Packet Radio Association
CAPRA – Chicago Area Packet Radio Association
FADCA – Florida Amateur Digital Communications Association
GRAPES – Georgia Radio Amateur Packet Enthusiasts Society
KCAPRG – Kansas City Area Packet Radio Group
MAPRC – Mid-Atlantic Packet Radio Council
MARDA – Mississippi Amateur Radio Digital Assn.
PPRS – Pacific Packet Radio Society
RMPRA – Rocky Mountain Packet Radio Association
TAPR – Tucson Amateur Packet Radio Corporation
UPRA – Utah Packet Radio Association

Articles and photographs are solicited dealing with any aspect of digital communications. Both technical and operational topics are desired including new product announcements and equipment reviews.

CONTENTS

NEWS AND VIEWS
Gwyn Reedy, W1BEL

PRM MILESTONE

This is a milestone issue of PRM in several ways. As the cover design emphasizes, the Tucson Amateur Packet Radio Corp. (TAPR) is now a participant in PACKET RADIO MAGAZINE (PRM). The famous Packet Status Register (PSR) will appear monthly as a distinct section of PRM. This is the culmination of a longstanding goal shared by myself and a number of the other TAPR directors. Circulation of the combined publication will now exceed 2200 monthly, and the initial mailing, which includes expired members, will be approximately 3500.

Personally, the combination of the publications will mean the opportunity to produce a better magazine for a larger number of packeteers. I have been editing and producing the FADCA>BEACON and its outgrowth, PRM (with generous help from Brad Voss, KE8CW, and Ted Huf, K4NTA) since January 1984. The PRM circulation has grown steadily and is nearly 1000 as of August 31st. I began editing and producing the TAPR PSR in June 1985. Since that time producing 16 issues (approximately 350 editorial pages) of the two publications per year has been a heavy task, and the timeliness of the publications has suffered. In addition, there were always hard decisions to be made about which publication should carry any particular article. Now the way is cleared for a more timely (when we catch up), interesting, and authoritative packet publication. Packeteers have only one place to look for the information about what is happening in packet development.

REVIEW OF THE NEW
KANTRONICS KPC-2400

John Graf, AH6CL
Reprinted from Compuserve Hamnet

The KPC-2400 is the latest in the line of TNCs offered by Kantronics, Inc. of Lawrence, Kansas. It has a suggested retail price of $349.00. It contains features identical to their earlier KPC-2, and in addition supports packet operation at 2400 baud. It accomplishes this feat by including a separate 2400 baud modem which can be enabled via software. The 2400 baud modem, unlike the 'standard' one for 300 and 1200 baud operation, utilizes phase shift keying (PSK). Signals are sent at a bit rate of 2400 baud, but the phase shifting occurs at 1200 baud. Thus the unit may be operated legally at the new speed on all frequencies above 28 MHz.

HARDWARE:

The KPC-2400 is an attractive unit housed in an extruded aluminum case. Front panel indicators include power on, transmit (PTT), receive, connected, and STA (which indicates the presence of an unacknowledged packet). Connections are made to the computer or terminal through a standard RS-232 connector (DB-25) and to the rig through an included 9 pin connector and cable. The user is required to supply the actual connector to the rig being used. 12 volt power is supplied either from the rig (via the supplied cable), or through a separate rear connector using an AC adaptor. Speaker audio may be obtained from a rear audio jack.

Internally there are user defined jumpers which may be used to change the transmitted audio level, switch between RS-232 and TTL signal levels, and allow the user to test on-board ROM and RAM. The quality of the construction and components appeared excellent.

For those of a technical bent, the unit utilizes a 6303 microprocessor for modem and housekeeping chores; an AM7910 modem for 300 and 1200 baud operation; and a proprietary modem for 2400 baud operation. The unit comes with 16K of on-board RAM, and is expandable to 32K.

SOFTWARE:

The KPC-2400 utilizes proprietary software on EPROM and claims compatibility with Version 2.0 of the ARRL AX.25 protocol. From a user standpoint this appears to be true. The command syntax and command list are a subset of the KPC-1 and KPC-2, with some additional commands for 2400 baud operation. In general, the command set is the same as found in the TAPR-2 with few and relatively insignificant differences.

The TNC supports up to 26 multiple connects, XON/XOFF, and hardware handshaking. The ample on-board memory allows your beacon text, connect message text, budlist, suplist, and unprotocoled packet lists to be 'permed' and alleviates the need to type these items in each time you power up.

Unlike the TAPR boards, the KPC-2400 utilizes an EEPROM for storage of command variables. Thus changes made to the command set while on-line are erased upon powering down, and only the 'perm' command will cause changes to be permanent.

The unit may be operated at standard TERMINAL rates of 300, to 9600 baud, and transmission rates of 300, 400, 600, 1200, or 2400 baud. Additionally, 6 tone pairs may be selected, which include Bell 202, Bell 103, and CCITT v.21 and v.23.

DOCUMENTATION:

The documentation consists of a 66 page spiral-bound book and one errata sheet. The book was a major disappointment and gave me the impression of being hastily concocted in order to get the KPC-2400 to the market place.

There were several typographical errors. The most damaging was in the cable connection instructions where the ground leads were incorrectly identified. Luckily threr is an accompanying diagram which can be used to solve the quandry. There was also an error in the identification of the XON/XOFF values which may be confusing.

The major difference between this unit and previous ones manufactured by Kantronics is the 2400 baud operation. Yet there is virtually no discussion in the manual on how to operate at this data rate. The user is left to his own devices to determine the correct settings of tone pairs, for instance. Simply entering 2400 baud operation with the 'HBAUD 2400' command could conceivably put you on the air with a tone pair that will not be read by another TNC. It was only through some additional research that the author was able to figure out the correct command sequence to get on 2400 baud operation.

On a positive note, there are some excellent examples and instructions for interconnecting various computers with the TNC, as well as examples of some simple terminal programs which may help a new user get on the air quickly.

OPERATION:

Operation so far has been simple and effective. The unit has shown no hidden bugs, and once properly configured, has been a joy to use. The commands to display correct settings and to list available commands are a real aid to operating for those of us with less than perfect memories. The unit appears to operate extremely well in marginal signal conditions, and packet retries have been minimal.

At the present time there is almost no 2400 baud operation on 2 meter packet, so it is difficult to determine how efficient this new rate will be. Kantronics claims that the Bit Error Rate (and consequently retry rate) is virtually identical to that found at 1200 baud. My limited connection time at this rate tends to agree with this claim. Of course the big advantage to 2400 baud operation is SPEED, and speed you get, in trumps. *Continued on page 13*

DIVIDE AND CONQUER

—THE FIRST STEPS TOWARD NETWORKING

Dennis Goodwin, KB7DZ, NAPRA Technical VP

Reprinted from ZERO RETRIES, Journal of the Northwest Amateur Packet Radio Assn., Vol. 2, No. 3.

Recently in the Northwest we have been able to send packets from Vancouver, B.C. down through to Southern Oregon. This has been accomplished by having many hilltop digipeaters on the same frequency. This was done as a first step to gain interest in linking. We know that this method is not ideal. It is rude and crude, but traffic does get through during non-busy hours. When busy hours come around you might as well forget getting traffic up or down the line. You won't get through. This can even affect local traffic on a local digipeater when two or more such digipeaters are adjacent. This comes about because one hilltop can hear the other one and will not hear others in its own area. You might think your local hilltop has gone deaf or dead. In actuality, it is suffering from too much of a good thing - it hears too well. How can this problem be overcome while allowing long distance traffic to flow? Read on.

Part of the key to all of this is to make sure adjacent hilltops cannot hear each other. This can be easily accomplished by having them operate on different frequencies. You say this is counter productive. In a sense you are right. Using this scheme you could not directly talk to a friend up or down the line on your local frequency. What is needed is a way to allow the hilltops to talk to each other without local traffic interfering [and to support local traffic without hindering hilltop to hilltop connectivity...ed]. The hilltops are tied together on their own linking frequency on another band.

· A special digipeater will be required to allow traffic to flow into and out of the hilltop linking frequency. It will act as a normal digipeater to local traffic and at the same time have the capability to operate on the linking frequency. It will route traffic to and from the linking frequency automatically. It will know when to leave traffic on the linking frequency that is not destined for its own local frequency. You might say it will act as a traffic cop. Is this pie in the sky or is such an animal around today?

The beast in question is called a dual port digipeater. Basically it is a TNC-2 with different software and some hardware modifications. External circuitry including a modem is connected to the terminal port for the linking frequency side with the internal modem used on the local frequency. Initially the linking frequency will run at 1200 baud, but our desire is to up the data rate to 9600 baud in the future. The problem is the lack of good reliable high speed radio modems.

Work is afoot around the country to crack this nut, i.e. make it SIMPLE and CHEAP. The ultimate goal is to be able to run at 56,000 baud on the 220 MHz or higher bands. Do we need to operate at such a fast speed or are we just speed freaks?

At a data rate of 1200 baud only one conversation can reliably (minimal retries) take place up and down the coast. As the linking frequency data rate increases more and more data can get through because it is on the air for a shorter time compared with the rate you are operating at. A side benefit is that your traffic gets through faster. This allows traffic from other areas to share the linking frequency. All of this traffic may not start or end on your local frequency. Quite a bit of the traffic will be passing through the linking side of the digipeater on its way to its true destination. So, as you can see, the faster the linking speed, the more people can be served.

The dual port digipeater is just the first step towards true networking. Operations will remain basically the same as today, i.e. level 2. Long haul traffic will have increased reliability. Also, congestion will be lessened on each local frequency. The important advantage is that the radio links themselves will have been put in place for the future network node controllers (NNC) and can be easily upgraded. The future NNCs are designed to handle true networking, i.e. levels 3 and 4. That discussion is beyond the scope of this article.

I hope this has shed some light on where we are going. Linking is the exciting and challenging part of packet radio. There is room for everyone to contribute in some way. The old adage applies, "if you wait for someone to do it, it won't get done." Help of all forms is needed. Please step forward and offer to give a hand. I promise you will not be bored.

– PRM –

STEVE GOODE MAKES GOOD

Paul Newland, AD7I

Kudos to our very own Steve Goode, K9NG, as reported in the August issue of Microwaves & RF on page 62, for his article at the 1986 Vehicular Technology Conference. Quoting uWave & RF:

> Steven Goode, of Motorola Inc.'s Chicage Corporate R & D Center (Schaumburg, IL) gave an important presentation on the open-loop technique for the coherent detection of minimum-shift-keyed (MSK) signals, which allows for direct observation of a recovered carrier. The application for this work is in the detection of spectrally efficient modulation methods for data transmission over land-mobile radio channels. Goode notest that a closed-loop coherent detector (a modified Costas loop) can be used to detect MSK an Gaussian minimum-shift-keyed (GMSK) modulation techniques. However, severe performance degradation in a Rayleigh fading field was observed with the closed-loop system.

Nice going Steve! Contratuations.

LOCATION IDENTIFIERS

Allan L. R. Snyder, N4US
3291 Minnow Creek Dr.
Brooksville, Fl. 33526

I've always had what might be called a proprietary interest in three-letter identifiers. The use of MLB, STU, WPB, etc., by wide area digipeaters is a good way to pinpoint the locations. It occurred to me that some background information about codes might be of interest to PRM readers and help with future selections.

About forty years ago, officials of the Air Transport Association recognized a growing need for a coordinated system of identifiers. Many two-letter codes were being used at that time. Airlines had some three letter indicators (city codes) which they used in reservation messages.

A 'high level' inter-agency committee considered this problem, and decided to produce a three-letter identifier system for the U.S., one that would be coordinated. It would let the FAA manage it. That meant the FAA would keep the records of code assignments, publish an official list with an outline of the justification for obtaining new codes, and handle requests for additional ones.

I was working at the Washington Headquarters of the FAA at the time. My work varied, but from time I would revise some of the Government landline charts, and I kept lists of all the FAA facilities and their identifiers for that purpose.

Probably because of this aspect of my work, the inter-agency committee that had decided to have a new U.S. identifier system asked me to be the FAA member of on of their subcommittees; a working committee that would select the new identifiers.

I was not particularly impressed with the assignment, and I'm sure no one else was. To guard against any put downs, I would often remark, "You have to be real smart to handle a job like that. You have to at least be able to spell CAT".

Because the FAA would be managing the new system, I brought the FAA lists of cities and airports, and a set of code assignment check-off-blocks to the subcommittee meeting, so that I would be able to keep track of the work we would be doing. Since I was armed with all the bookkeeping equipment, the subcommittee had me do the conducting and recording. I would announce the next airport or city that required a code, examine my code blocks to find a suitable open code, pick the most obvious one I could see, and propose it to the group. The members would consider each suggestion comment on it, give approval, and I would mark it off in the code blocks so we could avoid duplication.

The scheme I tried to follow was simple: Use the first letter of the city or airport as the first letter of the identifier. Use two additional letters from the name, preferably to make up a combination with mnemonic value. (That's why the airport at Pinellas Park, Fl. is PIE). Occasionally, the

airline representatives would ask us to keep one of the old time codes. LAX is and example, it was the original Los Angeles city code.

Each selection had individual consideration, but our selection method was designed to be fast. Most of the members of the subcommittee had flown in Washington for the meetings, and had to get back home within a reasonable length of time. The job took us about ten days. The subcommittee's streamlined process inadvertently made me the chief picker.

Subsequently, the FAA had me manage the system, and I issued the "location Identifier Manual" as a listing of the new codes. I understand that it is still being published. It can be obtained from the Supt. of Documents, Printing Office, as FAA issue 7350.5k It might be possible to get a used copy from an FAA facility, such as an airport tower, or one of the flight service stations.

The new identifiers were no sooner published than the aviation public started to use them in ways unrelated to their original purpose. The airlines used them for their baggage tags, the Post Office stencilled them on airmail bags, the FAA used them for automatic data distribution, and so forth. Using them as WA digipeater locators is not as far out as it might seem.

As expected, the Coast and Geodetic Survey started to print the new identifiers on charts, the airlines started using them as call signs on their aeronautical radio ranges. (WA digipeaters note). They also went into numerous publications. In no time at all, it became very difficult to change a code. The original choices, good, bad, and indifferent, were locked in. Because of the part I played in the subcommittee's code selection method, I took a lot of flak for the bad and indifferent choices. But I feel amply rewarded whenever I see and airline baggage tag on the sidewalk in front of an airport with one of our brainstorm code selections on it. Good old litterbugs!

To sum up:
1) The U.S. three letter codes should be called location identifiers;
2) The FAA handles the administrative work for the official system;
3) It is unlikely that anyone would object to use of the identifiers in applications other than those for which they were originally intended, as long as there is no interference with those purposes;
4) It would be advantageous to adhere as closely as possible to the established and coordinated list.

The code block assignment forms previously mentioned could be handy for FADCA, or a digipeater council to keep track of the three-letter codes, if packet use of them increases.

- PRM -

CACTUS CORNER

Lyle Johnson, WA7GXD

I have really enjoyed writing for Packet Radio Magazine in this column. It has allowed me to express opinions, muddy the waters and generally have a good time without it being construed as "offical TAPR policy."

However, as you will undoubtedly note (if you haven't already!), the Packet Status Register (TAPR's official publication) has merged with Packet Radio Magazine.

This has several benefits.

TAPR members will now be hearing from TAPR "officially" on a monthly basis. This certainly improves communications over the previous bi-monthly and quarterly issues of PSR and PSRQ.

It means that TAPR members will be able to easily stay informed on regional matters through PRM acting as the official newsletter of various packet groups.

It means that the Editor, Gwyn Reedy, W1BEL, will better be able to devote his limited time to PRM and PSR because he will now be editing 12 issues a year instead of 16. Thus, publication scheduling will probably improve (and Gwyn may get a chance to see his wife and kids!).

But, this new arrangement also has a liability.

Now folks can receive the PSR without being a member of TAPR.

This may be seen as a great way to save money, but it could be bad news for TAPR by diluting the already limited income derived from membership dues. Why pay for PSR when you can get it for free with your PRM subscription?

For this reason, TAPR has instituted a new dues structure that allows a person to become an Associate Member for only $5 per year. The Associate Membership does not include a subscription to PRM; it is intended for those who already receive PRM but wish to also support packet development at the national level.

If you are not a member of TAPR, I want to take this opportunity to encourage you to join.

On a personal level, I simply lack the time to write my portions of PSR and do a regular column for PRM every month. Therefore, this will be my last Cactus Corner for the forseeable future. On the other hand, if I am lucky I will be replaced as President of TAPR in February, in which case you may see the Cactus Corner re-appear.

Above all, Happy Packeting!

PSR

YAPP – YET ANOTHER PACKET PROGRAM

Dick Eastman, K1OJH
Reprinted from the NEPRA PacketEar

I've had the chance to use a new piece of software recently, called YAPP. YAPP is a terminal emulator program for the IBM-PC and most all of the clones. It is optimized for packet use, supporting the TAPR TNC-1 and TNC-2 software. This will include most of the TAPR clones.

This program was written by Jeff Jacobsen, WA7MBL. Jeff is well-known for writing the MS-DOS clone of the WORLI Xerox BBS. Jeff is offering this program to the amateur community under the shareware concept: It is legal to copy the disk and pass it on to someone else. If you like it, send Jeff a contribution of at least $20.00. If you do not care for it, erase the disk or pass it on to someone else. The honor system rules here!

There are a couple of notable features of this program. First, it runs in split-screen mode. A horizontal bar appears about 20 lines down from the top of the screen. What is being received is displayed above the line, while what you type is displayed below. You may "type ahead", that is, what you type on the keyboard is not actually sent to the TNC until the ENTER or CARRIAGE RETURN key is depressed. It is possible to watch incoming text while composing an answer. The other feature is the inclusion of a method of transferring binary files. If the person on the other end is also running YAPP you may send an 8-bit .com or .EXE file or program to him. Another feature is a "gateway" to MS-DOS. With this feature, while in the midst of using the terminal emulator, you may temporarily exit to DOS, run another program, copy or erase files, etc. You may quickly exit back to YAPP at anytime, while still CONNECTed. All-in-all a rather neat program for only $20.00.

A copy of this program may be obtained by either sending $5.00 or by a blank, formatted disk together with an addressed, postage-paid return mailer to:

AzPRA – Arizona Packet Radio Association
c/o Wes Morris, K7PYK
7422 E McKinley St.
Scottsdale, AZ 85257

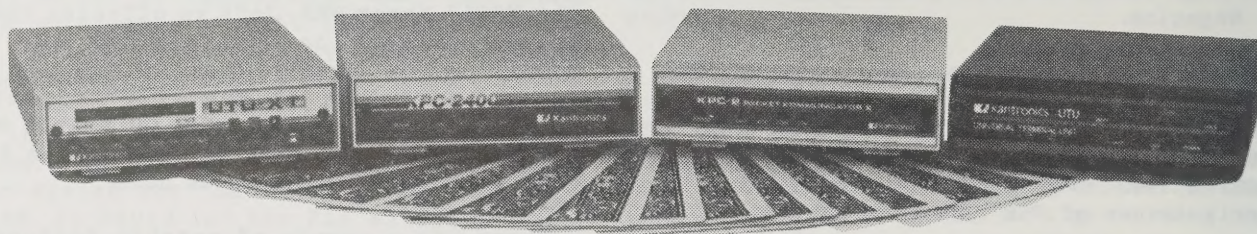A copy should also be available for downloading from Hamnet on Compuserve.

By the way, the program doesn't perform too well under DESQview or DoubleDOS, probably not under any other multi-tasking software. It apparently writes directly to the screen.

-PRM-

FOR SALE

WHERE DID I SEE THAT ARTICLE?

Rich Rosen, K2RR

A key to all the articles that have appeared in QST, CQ, Ham Radio and 73 magazine since their first issue is now available. It's available in the form of a two volume set called "From Beverages Thru Oscar – A Bibliography". Contained within the 764 pages are over 36,000 references to these articles divided into 92 separate chapters.

For those interested in antennas there are dedicated chapters on Beverages, Yagis, Quads, Rhombics, Slopers and 160 meter aerials to name a few. Construction type articles run the gamut from beginner to advanced. In the nostalgia area for those old enough to remember there was the series of articles called The Old Man that appeared in early issues of QST–they too are referenced within. As the title implies "Beverages Thru OSCAR..." references articles that go back to the wave antenna discussed by Harold H. Beverage in the 20's to various OSCARs launched within the past few years.

Besides the four leading U.S. radio amateur monthlies over 280 other magazines, journals and publications have been searched for similar subject material. The thing that makes it so valuable is that it is comprehensive. Even if your collection of magazines is limited "Beverages Thru OSCAR..." will help you utilize them to the fullest. Remember – every page was individually researched and if it appeared in the magazine a reference to it now exists. Even one-line corrections have been included.

The cost for both volume 1 (Jan. 1945-Dec 1978) and volume 2 (Jan. 1979 – Dec. 1981), direct from the publisher (Rich Rosen, K2RR) is $40 which includes postage and handling. Volume 3 is being worked on now and in the future all three may be available on Commodore, Apple, IBM, and HP formatted discs as well.

– PRM –

"FROM BEVERAGES THRU OSCAR – A BIBLIOGRAPHY"

288 different magazines, journals and publications that include **PIRE, TAP, BSTJ** and **QST** comprise the source material for this book.

620 pages of chronological data (see "typical page"), spanning a 65 year period, is available as a book or in individual booklet form. (choose subject areas from the list below)

A need to rapidly locate articles started it all. I needed — so why not others?

LIST OF SUBJECTS

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0001 INVERTED VEE ANTENNAS
0002 BEVERAGE AND OTHER WAVE ANTENNAS
0003 GROUND SYSTEMS
* 0004 YAGI-UDA PARASITIC ANTENNAS
* 0005 PROPAGATION,ASTRONOMY
0006 ELECTRONIC SCANNING/STEERING
0007 SUPER DIRECTIVE ARRAYS
0008 MINIATURE RECEIVING ANTENNAS
0009 LARGE LOOPS:QUADS,DELTAS
0010 SHUNT EXCITATION
0011 RHOMBICS
0012 CURTAINS (BRUCE,STERBA)
0013 GROUND PLANE VERTICALS
0014 SLOPING ANTENNAS
0015 BALUNS
0016 WIND LOADING,STRESS ANALYSIS
0017 COLLINS RECEIVER MODIFICATIONS (75A,51J,S-LINE)
0018 GAMMA/OMEGA MATCH
0019 DIRECTIVE ANTENNAS,MISCELLANEOUS
0020 VEE ANTENNAS
* 0021 MEASUREMENTS,TECHNIQUES AND INSTRUMENTS
0022 NOISE
0023 BROADBAND ANTENNAS
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0025 SITING
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0027 MINIATURE AND REDUCED-SIZE TRANSMITTING ANTENNAS
0028 HELICALS
0029 DDRR ANTENNAS
* 0030 LINEAR AMPLIFIERS AND ASSOCIATED POWER SUPPLIES,ETC
0031 EICO 753 TRANSCEIVER MODIFICATIONS
0032 REMOTE CONTROL DEVICES
0033 PREAMPLIFIERS
0034 HEATHKIT SB SERIES MODIFICATIONS
0035 PHONEPATCH AND TELEPHONE CIRCUITS
0036 NOISE BLANKERS,LIMITERS AND GENERATORS
0037 ROTATORS,DRIVES AND INDICATORS
0038 TOWERS AND MASTS
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0040 PC BOARD FABRICATION AND MATERIALS
* 0041 TUNERS,COUPLERS,TRANSMISSION LINES AND CONNECTORS
0042 ALTERNATE POWER SOURCES
* 0043 CONVERTERS
0044 T.O.M. (THE OLD MAN)
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* 0048 SIGNAL ENHANCEMENT TECHNIQUES
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0050 TRANSFORMERS,RELAYS AND TRIACS
0051 INDICES
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0054 RADIO REGULATIONS AND LICENSING OVERSEAS
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* 0061 SOLIDSTATE CIRCUITS (XMTRS,AMPS,ETC)
0062 HAZARDS
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* 0064 50 MHZ AND UP (VHF/UHF/MICROWAVE ARTICLES AND CKTS)+F.M.
* 0065 KEYERS,CALLING DEVICES,READERS
0066 ANTENNA HARDWARE
* 0067 SURPLUS
* 0068 MOBILE (ANTENNAS,REGS,ETC)
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0070 AUDIO FILTERS (PASSIVE AND ACTIVE)
* 0071 RTTY
0072 AMATEUR TV, FACSIMILE
0073 SOLIDSTATE PWR SUPPLIES,MULTIVOLTAGE TUBE PWR SUPPLIES
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* 0076 PC BOARD ARTWORK (SPECIFIC CIRCUITS)
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0082 DRIVEN ARRAYS-OTHER THAN LOG PERIODICS
0083 160 METER ANTENNAS AND EQUIPMENT
0084 COMPUTERS,PROGRAMMING,MICROPROCESSORS AND PERIPHERALS
0085 WRITING
0086 BINDING MAGAZINES
0087 73 MAG CARTOONS
* 0088 INTERESTING CIRCUITS
0089 POWER LINE CIRCUITS
0090 INTERESTING ARTICLES
0091 YAESU IMPROVEMENTS
0092 LASER,OPTICAL SIGNAL PROCESSING
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0064    50 MHZ AND UP (VHF/UHF/MICROWAVE ARTICLES AND CKTS)
AREA ABBREVIATED TITLE OR TOPIC SYNOPSIS  FROM YRMO PAGE
0064  144,220 & 420MHZ DISCONE ANT       0001 7812 0028
0064  DOUBLE STUB TUNER FOR 1296MHZ      0003 7812 0072
0064  1 GHZ DIVIDE-BY-FOUR PRESCALER     0001 7812 0084
0064  AN X BAND TRANSCEIVER              0004 7812 0064
0064  A 220MHZ CLASS AB,C AMP            0001 7811 0029
0064  A 2M FO SYNTHESIZER FORM           0001 7811 0033
0064  FOR ALIGNING 2M BEAM ELEMENTS      0001 78
0064  2M XMTR
0064  2M FET GDIP FOM POWER 4W
0064  THE THE PREAMP
                                         (TYPICAL PAGE)
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Packet Status Register

Number 21

Tucson Amateur Packet Radio Corporation

PRESIDENT'S COLUMN

Lyle Johnson, WA7GXD

We hear and obey!

The April PSRQ questionnaire was responded to by nearly one-fourth of all TAPR members. This level of response is very unusual. And most gratifying.

As a part of your recommendations, PSR has merged with PRM. Beginning with this issue, PSR will be coming to you every month, along with a lot of information from regional packet groups and general packet information. Please see the Cactus Corner column in the PRM section of this magazine for a little more information on the merger.

With the increased circulation for both publications, I hope that more of you will submit material for inclusion in PRM or PSR. Please note that you can mark the submission for PSR and it will appear in the PSR section of PRM.

Elsewhere in this issue of PSR you will find an article declaring the end of DRNET and the beginning of an "official" TAPR presence on CompuServe.

TAPR may have CompuServe "Starter Kits" available at a discount (for members only) to get you up and running on CompuServe. Watch the October PSR for details.

A tutorial article on Manchester Encoding also appears for those of you curious about this method of sending your packet signals to the packet experiment (Mode JD) now orbiting as part of JAMSAT-OSCAR 12 (also known as JAS-1, JO-12 and Fuji).

TAPR volunteers are busy preparing a kit to allow you to interface a TNC 1, TNC 2 or clone to a 2 meter FM transmitter and a 70 cm receiver and work Mode JD on the newest OSCAR. Look for an update in the October PSR.

San Diego and the ARRL Nationals!

The weekend of September 5 through 7 found a lot of packeteers gathered in San Diego for the ARRL National Convention. And the Nationals.

The packet booth was manned by SANDPAC (San Diego Packet Group) volunteers with some help from out-of-towners. There was a LOT of interest in packet at this convention.

Three hours of packet forums (tutorials, introductory material, HF, emergency operation, networking, etc.) on Saturday afternoon were very well attended. I want to thank Mike Brock, WB6HHV, for his considerable efforts at coordinating the packet presence at the convention.

Many of our newer members may not realize that TAPR moved from being a loose collection of Arizonans to a serious, regional group at the ARRL Southwestern Division Convention held at the very same location as this year's national back in June of 1982!

At that time the TAPR ALPHA TNC was displayed, running a crude prototype and testing protocol over a wire link (on the air packets weren't sent successfully until a week or two later).

Being a low-budget operation, those of us who came from Tucson to San Diego that year camped on the beach. Yes, camped. In tents.

I will always remember the sight of extension cords running into a small two-man (well two-person, I shared it with my wife) tent into which were crammed two trerminals, two ALPHA TNCs and about 3 people feverishly fiddling with things to get the demo in working order.

And I will never forget seeing TAPR President Den Connors, KD2S, sitting in a lawn chair halfway between the men's room and a public telephone booth (San Diego beaches are well equipped!).

What's so odd about that?

On his lap was a TI Silent 700 printing terminal. There was an extension cord running from the terminal, through the window of the men's room, to an AC outlet. On the side of the terminal was a handset from the telephone booth. Den was plugged into an on-line database service (a forerunner of DRNET)!

Anyway, we got the demo running, borrowed a portion of the SCARCC booth to set it up, hung a sign that said TAPR and signed up almost 100 members! We met a fellow named Harold Price and another named Dave Henderson. These two guys teamed up with Margaret Morrison and wrote some real packet software for the Beta TNC and later TNC 1 kits.

That was also the one time I met Vic Clark, then President of the ARRL.

In 1982, no manufacturer made packet gear for the Amateur market.

BEGINNER'S CORNER:

MANCHESTER ENCODING
AND OSCAR 12

Lyle Johnson, WA7GXD

JAS-1 is in orbit!

This newest Amateur satellite, designed by Japanese Amateurs and launched by NASDA, the Japanese space agency, was lifted into orbit on an experimental H-1 rocket on August 12, 1986.

Carried aboard JO-12, as it is now designated, is a packet experiment called Mode JD.

Briefly, Mode JD is a digital packet bulletin board system. The uplink is on two meters, of which there are four channels (145.850, 145.870, 145.890 and 145.910 MHz) and the downlink on 70 cm (435.910 MHz). The uplink to a satellite is the frequency used to send information from the ground to the satellite; the downlink is the frequency used to send information back to the earth from the satellite.

All channels run at 1200 baud, and the uplink channels are 2 meter FM! The uplink uses FM, in part because most packeteers already have accesss to suitable 2 meter FM gear.

The downlink channel uses phase-shift keying (PSK) modulation and will require the use of an SSB receiver and a special demodulator. This may be the subject of another article in a future PSR.

Unfortunately, a satellite is a very complex device, and an Amateur satellite is usually constrained by weight and size to be very, very small.

For the designers of Mode JD, it was important to make the circuitry as straightforward as possible. And when JAS-1 was designed, there were no CMOS HDLC chips like the SIO chip used in the TNC 2. Thus, they had to make the HDLC encoder and decoders with standard CMOS chips. To simplify the design (and save about 24 ICs!), they decided to require Manchester encoding by ground stations wishing to send data to JAS-1 on the Mode JD uplink.

Now, AX.25 is supposed to be encoded in HDLC frames and we usually send these frames at 1200 baud using FSK modems and a format called NRZI (non return to zero, inverting). As you probably recall, NRZI encodes a zero as a change in state (or tones) and a one as no change in state (the tone remains steady, whether it is a high tone or a low tone). This is illustrated below:

```
Data      0   0   1   0   1   1   0   1
          !   !   !   !   !   !   !   !   !

NRZ       _____        ____

NRZI      _____        ____
```

With Manchester encoding (or, more precisely, Manchester II encoding), the clock information for the data is mixed with the data and sent every bit time. A one or a zero is determined by the fact that a one has a positive-going edge in the middle of a bit and a zero has a negative-going edge in the middle of the bit.

The advantage for the satellite designers is a simplified clock recovery system. Fewer parts to find room for, and fewer parts to fail.

The disadvantage for the packeteer is that he must now have a special adapter to change his data from NRZI to Manchester format. As it turns out, JAS-1 expects the Manchester encoding to be done after the NRZI encoding. This simplifies things for us considerably!

Let's look at the same data as before, but with Manchester encoding shown as well:

```
Data      0   0   1   0   1   1   0   1
          !   !   !   !   !   !   !   !   !

NRZ       _____ ____     _____     ___

MAN       _ _ _ __   _ ___  _ _ ___  _ _

NRZI      _      _____           _____
```

Notice that a low-going edge occurs in the middle of every 1 and a rising edge occurs at the center of every 0.

If you look carefully at the back-to-back 0s at the beginning of the data stream (left end), you will note that the Manchester data looks like a square-wave at twice the frequency of the NRZI data. In fact, Manchester encoding uses more bandwidth than NRZI for sending the same data.

However, a typical 2 meter FM transceiver can usually send Manchester-encoded 1200 baud data. Notice further that the Manchester signal has an exactly equal amount of time spent in the high and low states. This means that there is no "residual" DC component of the data, which can also help in the desig of the modulator and demodulator.

"This is all well and good," you may say, "but how can I genrate a Manchester signal for JAS-1? And do it cheaply!"

Let's look at our data one more time, but this time let's put our 1200 baud clock in the diagram:

```
Data      0   0   1   0   1   1   0   1
          !   !   !   !   !   !   !   !   !

NRZ       ____        ____

CLOCK     _ _ _ _ _ _ _ _

MAN       _ _ _ _ _ _

NRZI      ____        ____

CLOCK

JAS
```

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The line labelled "JAS" shows Manchester encoding of the NRZI data. The line labelled "MAN" shows Manchester encoding of the NRZ data.

If you look carefully, you may notice that the JAS data is (logically speaking) the result of an exclusive-oring of the clock and NRZI data.

The truth table for an EXCLUSIVE-OR gate is:

```
Input A   Input B | Output
------------------+-------
   0         0     |   0
   0         1     |   1
   1         0     |   1
   1         1     |   0
```

So, all we have to do is take our 1200 baud clock, exclusive-or it with our NRZI data, and apply it to our transmitter.

If you think about the waveform a little more, you will realize that it consists of pieces of square waves that are either 1200 Hz (when 0s or 1s are strung together) or 600 Hz (when 0s and 1s alternate). So, since we have no dc component, and our frequencies of interest are within the passband of a typical FM transmitter's audio response, we can simply shape the digital data itself and transmit it! We don't need any FSK modulators, or tone generators at all!

Of course, there are plenty of sidebands generated at our audio baseband, but by and large we can get the most important ones through our audio system.

Finally, in order to minimize the bandwidth required and meet other requirements of the demodulator, our clock and data must be well synchronized.

Fortunately, the modem disconnect on TNC 1s and TNC 2s provides a signal that can be easily manipulated to provide such a synchronized clock. This is shown schematically below:

The TNC-provided clock of 19.2 kHz is 16 times the desired 1200 Hz clock signal. So, we apply the clock to a divide-by-16 counter and voila! we have our 1200 Hz clock.

Unfortunately, even though the TNC also derives its internal 1200 Hz clock from the same source, the output of our divider has a one in 16 chance of being in the right time relationship to our data, or a 94% chance of being in the wrong phase (before the Murphy factor which guarantees that the phase will be right during prototype testing and wrong when the units are shipped to customers in the field).

This is clearly unacceptable.

So, we use a D-type flip-flop and an EXCLUSIVE-OR gate to generate a reset pulse to our counter to ensure that it is synchronized with the rising and falling edges of our data.

A "D" flip-flop makes the output line (Q) the same logic level as its input line (D) with every rising edge of the the clock line (CK). When our input data changes state (from a 0 to a 1 or vice versa), the output (Q) and input (D) will be of opposite levels for one clock pulse.

Another way of stating this is that the Q output lags the D input by one clock pulse.

EXCLUSIVE-OR gate 1 compares the D and Q levels. If they are the same, the exclusive-or output is low. If they differ (which happens whenever the data changes betwen 0 and 1), the output of EXCLU-SIVE-OR gate 1 goes high, resetting the divide-by-16 counter at the time of the data change. Thus, the counter output is synchronized to the data. This circuit only requires one data transition to lock the clock to the data.

Next, the synchronized clock is applied to one input of EXCLUSIVE-OR gate 2, with the data applied to the other input. The output is Manchester encoded data suitable for JAS-1.

Finally, the 5-volt square-wave output from EXCLU-SIVE-OR gate 2 is attenuated and shaped by filter R1 and C1 to provide a low-level audio signal suitable for application to the microphone input of a transmitter.

There you have it. Simple and cheap!

Next month I hope to get the second installment of the state machine article ready for you. Until then, keep those packets flying!
*****

TAPR MOVES TO COMPUSERVE
Pete Eaton, WB9FLW

Effective 1 November 1986, TAPR will move its telecommunications from DRNET to Compuserve's HamNet Special Interest Group.

Over the last two years DRNET has served as a critical link during several R & D projects. Unfortunately, due to the limited accounts available on the system, many folks felt left out. In fact in TAPR's recent poll of members a large percentage of those responding urged TAPR to move DRNET's function to a more public forum. Of all the alternatives, Compuserve's Hamnet was by far the most popular, and has established itself as a prime source of packet information.

With this move TAPR hopes to make its activities and projects more well known to others around the country. At the same time it should make communications between all Packeteers more open.
- PRM -

President's Column continued from page 9

In 1986, every manufacturer is aware that packet is a very important force in Amateur radio. Four packet manufacturers had gear displayed at their booths. And distributors came with lots of TNCs. Many left with none...

What are the Nationals? (or, Packet in the Fast Lane, or Exec VPs Seem to Have All the Luck)

Unlike the Wouff Hong initiation, the Nationals are not (yet) an ARRL-sanctioned event.

Last year, in Louisville, several of us got lost on the freeway (we were "exploring" the driver said) and noticed a sign for a Malibu Raceway. We stopped in.

A Malibu Raceway is a racetrack with small, high-performance racing cars. Top speed is about 35 mph, but it seems a lot faster! We raced and decided to do it again the next night.

So we did.

The winner? None other than Dave Sumner, K1ZZ, ARRL Exec VP and General Manager. Don't let Dave's quiet, dignfied manner fool you...

Anyway, there is a Malibu at San Diego, so we held the ARRL Nationals. This year's winner was Pete Eaton, WB9FLW. (Dave failed to come this year.)

Please note that Malibus are operating at Miamisburg (near Dayton and the scene of a heat won by PSR and PRM Editor Gwyn Reedy, W1BEL, during the Hamvention) and Tucson (won this year by Chris Clark, N7GNT, of Salt Lake City).

Next offical race to held in Tucson at the Annual Meeting on Friday, February 20th, 1987.

*****

RMPRA ⟩ PACKET

The Official Newsletter Of The Rocky Mountain Packet Radio Assn.

RUNNING UNMODIFIED WORLI PBBS CODE ON A PC CLONE

Pete Stone, KOVLD

The popular WORLI PBBS code is written in Z80 assembly language and runs under the CP/M operating system using a customized BIOS (Binary input/output system) for the Xerox 820 computer. Since the IBM-PC and its clones use a different processor (an 8088), a different operating system (MS-DOS or PC-DOS) and different I/O hardware, it is impossible to run WORLI's code directly on a PC or clone. By using an emulator program, however, it is possible to create an environment within the PC to make the WORLI code 'think' it is running on a Xerox 820. I have recently completed a program which does just that. This program emulates the Z80 micro-processor and the CP/M and BIOS enviroment in the Xerox 820 thus allowing unmodified WORLI PBBS code to be run on a PC.

In order to run the emulator and the BBS code, the following are required:

- An IBM-PC or clone with at least 256K bytes of memory
- At least one 5 1/4 inch floppy disk drive
- MS-DOS or PC-DOS version 2.1 or later
- One or two IBM-PC compatible serial ports with modem cables to connect them to the TNCs
- One or two TAPR compatible TNCs
- A copy of WORLI's TNC.COM program and CONFIG.TNC file on an MS-DOS disk
- Your favorite editor for customizing the CONFIG.TNC file
- A copy of my emulator program (WORLICPM.EXE)

After customizing WORLI's CONFIG.TNC file just as you would on the Xerox 820 system, setting up your disk the way you want for BBS operation and connecting the TNCs to the serial ports, you run the emulator by typing 'WORLICPM TNC'. The BBS then comes up exactly as it would on a Xerox 820.

The primary advantage of the emulator approach is that since the same code is run in the emulator as on the Xerox 820 version, any new features added to that code are immediately available on the PC version. The main disadvantage of using an emulator is speed. While I was developing the emulator, a major concern was would it be fast enough to provide reasonable performance in BBS operation? When the code was finished, I was pleasantly surprised to find that although it 'feels' slightly slower than the Xerox 820 from the console, over the radio link there is virtually no perceptible difference in performance.

Rumor has it that Hank (WORLI) is translating his BBS code into the C langauge so it can be more easily ported to a variety of computers. Clearly that is the right approach. When that code is readily available, there will be no need to run an emulator version. In the meantime, however, with this emulator, all of the existing features of the the WORLI PBBS system are available on a PC.

At the time of this writing (September 18th), I have had the code on the air for a week at my home QTH and I am getting ready to distribute several copies to selected alpha sites to give it the acid test before releasing it for wider distribution. I am presently completing some of the user documentation and making some distribution arrangements. I hope to be able to release it for general distribution in early November. Interim arrangements have been made with NOCCZ to handle the distribution of the software. Expect a few weeks delay until the first diskettes are mailed. For a copy of the emulator and WORLI code, send a blank diskette and a prepaid diskette mailer to:

Andy Freeborn, NOCCZ
5222 Borrego Drive
Colorado Springs, CO 80918

As with WORLI, this code (with emulator source if desired) will be available free of charge to the amateur packet radio community.

- PRM -

CONCLUSIONS:

The KPC-2400 is an excellent packet TNC which has features and performance at least equal to, and perhaps superior to, the other commercially available units. The only weak point uncovered by this user was the documentation. The 2400 baud feature is a big plus which has the potential to ease some of the crowding found today on VHF packet. Whether this 2400 baud feature will become an industry standard, and whether or not the 2400 baud feature is worth the added expense of this TNC are questions that will be answered in time to come.

- PRM -

ALA -- NET

SOUTHNET IV ANNOUNCEMENT

Ala-Net and the Montgomery Amateur Radio Club are sponsoring a SOUTHNET PACKETFEST in conjunction with the Montgomery Hamfest, October 25-26, 1986. Hamfest site is the Civic Center in downtown Montgomery. Our column this month is devoted to information about the shedule of events and travel instructions.

SOUTHNET activities begin Saturday afternoon after everyone has had a chance to browse the hamfest.

SATURDAY

1300-1600	Packet equipment displays
1300-1500	How to operate packet and packet BBSs
1300-1600	Coordination meetings
1500-1600	Ala-Net Meeting
Evening	Informal social and pay-as-you-go dinner at Quincy's Steak House, Ann St. at I-85, about one block from the Econolodge Motel

SUNDAY

1000-1200	State Activity Reports: Alabama, Florida, Georgia, Kentucky, Mississippi, Louisiana, North Carolina, South Caroling, and Tennessee
1200-1300	NNC (Network Node Controller) report
1300-1600	SOUTHNET general meeting

The schedule is still flexible and any and all presentations are welcomed. Contact Leigh Bartlow, WD4CPF, 2107 Shades Crest Rd. SE, Huntsville, AL 35801. (205) 533-5596.

OTHER DOIN'S

- FCC amateur license exams
- Ladies Program
- AMSAT meeting/forum
- FCC forum with rep from Atlanta FCC office
- ARRL and M Net
- All service MARS
- Ala Repeater Council.

Awards:
Saturday @ 1500 - ICOM IC02AT
Sunday   @ 1400 - ICOM 745 w/PS and mic
                - VHS full featured VCR
                - ICOM 3200A V/UHF dual bander
                - Several ICOM 2ATs
                - Packet TNCs

Places to Stay:
- The Madison Hotel, within two blocks walking distance, $42.00. (800) 228-5586, specify Montgomery Hamfest.
- Econolodge, 2 miles from hamfest site, at I-85 and Ann St. $32.00. (800) 446-6900, specify hamfest rate.

Directions: (see map
- The Montgomery Civic Center is located on the North side of Bibb St. between Lee and Moulton. (Bibb St. becomes Madison Ave. to the East and Herron to the West.
- From the North on I-65, exit at Clay St., continue on exit ramp to Herron St. (one way.)
- From I-85, get on I-65 headed North and follow next step.
- From the South on I-65, exit at Herron St.

Talk-in on 146.24/84, rag chew on 147.78/18 and 449.50/4.50. Autopatch on 146.04/64 (* to activate, # to deactivate, add the digit 9 before number.) Packet BBS is WB4OZN on 145.010 via MGY. Local LAN on 145.69.

Pay parking in front lot of the Civic Center, free parking in the large lot on the North side of the Center across the street.

Hope to see you there!
                                    - PRM -

News and Views continued from page 1

Another personal milestone is that this is the last issue produced while I am an active duty member of the Air Force. (If I don't get it out the door soon, it may be the first one produced as a retiree, HI.) After 22 years of flying airplanes and desks, and lots of computer work, I'll now be devoting my energies to Pac-Comm full time. There should be some additional free time, however, to be active on the air, to run FADCA, and to produce PRM.

Several additional large packet clubs are considering joining PRM, and I expect the rate of growth to increase. The economies of larger print runs will allow more pages monthly with no increase in cost. Thanks to our advertisers for their support in paying the bills.

For the initial mailing, no steps have been taken to identify the names of persons that were previously receiving both PSR and PRM. I recommend that those of you who get dupoicate issues give one to a non-member as an inducement to encourage him to join one of the clubs. At renewal time for your various memberships, you can decide which one you wish to retain, or you can get PRM by joining a regional club.

COMPUTING ACROSS AMERICA

The high tech nomad has caught a second wind. Steven K. Roberts and Maggie Victor are on their way in the second Compute Across America. Their first stop was the 86' Expo in Vancouver, B.C., where the "Winnebiko II" was on display.

The "Winnebiko II" is an even higher-tech version of the bike Steven used during his last Compute Across America trip. The "Winnebiko II" has 5 on-board computers, additional solar panels, a Yeasu transceiver, satellite data link, and of course a TNC for packet radio operation. The 8 ft, 36 speed recumbent will be Steven's home and office for the next 10,000 miles.

Watch for future press releases here in PRM and watch for Steven's call letters, KA8OVA.

The solid line shows the route of Steve's 9,760 mile journey: the dashed line represents a rough approximation of the route he and Maggie plan to cover next. Whim and weather, of course, are sure to change this completely.

The Winnebiko II, showing the new console containing 5 computers, satellite data link, ham radio station, power management system, and more. Total weight is estimated at 225 pounds: overall length is 8 ft. Two solar panels provide 20 watts of electricity to charge batteries that run the equipment (everything except the wheels, that is, which run on pizza and omelettes).

– PRM –

Computing Across America

Downtown Montgomery

PPRS

PACIFIC PACKET RADIO SOCIETY

Walter E Miller, AJ6T
PPRS President

PACIFIC DIVISION ARRL CONVENTION will be held October 3rd and 4th at the Red Lion Hotel in San Jose. AJ6T will speak at 11 AM Saturday on "Northern California Packet Update" and a packet Q&A forum will be held on Sunday at 8:30 AM. The Saturday session will include a packet demo with a big screen projection TV. I hope to see many PPRS members there.

PACKET FREQUENCY COORDINATION....All repeaters and digipeaters in Northern California are coordinated by NARC (Northern Amateur Relay Council). The PPRS frequency coordinator, George Flammer (WB6RAL), assists NARC with digipeater sanctions and has provided the following list of sanctioned digis in Northern California. Notice how short the list is compared to the actual number of active digipeaters! An asterisk indicates that a request for coordination has been made, but has not been approved yet. Proper coordination will be very important for the imminent level 3 networks. Coordination of PBBS is under consideration by NARC; contact the PPRS Board of Directors if you have an opinion regarding the propriety of PBBS sanctioning.

NARC/PPRS SANCTIONED N.CALIFORNIA DIGIPEATERS (7/86)

Freq.	Call	QTH	Application Date
145.01	W6AMT	Crystal Peak	1Mar85
145.01	W6AMT-1	Wilmmams Hill	1Mar85
145.01	W6AMT-7	St. John Mtn.	1Mar85
145.01	WA7DIA-1	Reno	1May85
145.03	WA6FSP-1	Melcher Hill	3)*Y85*
145.03	N6DBT-1	Livermore	3Sep85*
145.03	N6DBT-2	Fremont Peak	3Sep85*
145.03	W6OA-1	West Obs. Pt.	18Dec85*
145.03	W6PW-1		1Jan86*
145.05	WB6RFW	Montebello Ridge	7Jan86*
145.07	WB6KHP-7	East San Jose	3Dec85*
145	6CMU-1	Berkeley Hills	15Sep85*
145.09	WA6OSA-3	Bald Mtn.	15Sep85*
223.56	NT6V-1	Grizzly Peak	8Feb86*
441.50	WB6CFD-1	Pleasanton	20Mar86*

Here is a report from Dave Engle, KE6ZE, regarding KA9Q's recent visit to the SF Bay Area:

"Phil Karn, KA9Q, came to Monterey on business to attend a TCP/IP vendors conference. While he was there he took out a little time to visit some of our local packeteers and swap tall tales. As some of you may know, Phil is involved professionally with TCP/IP datagram communications. He is the most active proponent of datagram (packet) protocols for Amateur Radio use in the above-layer-3 protocols. Things have been going slowly for Phil as he didn't know where he could test TCP/IP. It was suggested that maybe we could test the stuff for him out here. Phil was agreeable to this, and sometime in the future we may be able to put up a test case for TCP/IP long haul communications here in the Bay Area. The visit was relataively short, so not much else was covered. Those able to see KA9Q were W3VS, AA4RE, WD6CMU, KA6M, N6FQR, WB6RAL and KE6ZE."

... Site Of The First U.S. Digipeater

At the September PPRS Board of Directors meeting, WB6RAL revealed that he had offered the W6AMT digipeater network (which consists of W6AMT-0,1,2,3,4,7) as a test site for Phil's TCP/IP code. One proviso was that the code must work with ordinary AX25 in addition to TCP/IP. George also reported that he is trying to convert some Mocom-70 rigs to 6 meters for packet networking. Perhaps the much-discussed "220 backbone" will show up on 6 meters instead.

WB6RAL gave the PPRS BoD a report on the recent ARRL National Convention in San Diego. Apparantly everyone was buzzing about packet. AH6P told George that he will include the W6AMT chain in his beacon path from Hawaii in an effort to catch KH6-W6 long haul tropo openings automatically with packet (that path opens up a few times every summer in July or August on 2m and 70cm).

The guest speaker at the September PPRS general meeting was Chas "Woody" Woodson, W6NEY. Woody is a professor of Computer Science at UC Berkeley. He discussed coherent CW (CCW) and demonstrated its weak signal capabilities by playing some audio tapes of on-the-air CCW transmissions. The CCW receiver coz}d recover an almost inaudible signal buried in the noise. HF CCW requires a frequency stability of about 1 part in 10 million. For details on CCW see W6NEY's articles in May/June 1981 QST.

I am trying to arrange for a speaker from the ACLU to come to the PPRS October meeting to discuss Electronic Communication Privacy Act (S.2575). If this law passes in Congress, it will be ILLEGAL TO LISTEN on portions of the radio spectrum. Plans have not been finalized yet, so keep an eye on your local BBS for the meeting announcement.

The November PPRS meeting will feature Jim Ericson, KG6EK, who will speak on LOWFERS. Unlicensed LOWFER operation is authorized by the FCC on 160-190 KHz with a power limit of 1 watt and a maximum antenna length of 50 feet. This should be an interesting session for those of you who think 160 meter operation is difficult!

Nominations for next year's PPRS president will be open at the October and November general meetings. The election will be held in December. If you are interested in any of the PPRS Board of Directors positions, please contact AJ6T. Remember that the December meeting is our annual "hardware night." We try to have as many different TNCs as possible in operation at that meeting. We need volunteers to bring their equipment and demo it to the PPRS membership. Start planning now.

CORRECTION: The correct N-S California BBS pipeline is: KA6M-1, N6IIU-1, W6CUS-1, AA4RE-1, KE6BX, W6IXU, WB6KQY, WB6KAJ-1, KD6SQ. Note that the "SF" command must be used to leave a message on all of the BBS in the pipeline.

PPRS mail can be directed to AJ6T @ W6CUS-1, via Compuserve (76625,476), or via USPS (POB 51562, Palo Alto, Ca. 94303). PPRS meetings are held the first Tuesday each month at 7:30pm at the Ampex cafeteria in Redwood City.

- PRM -

Jack Coffee., WD5ELJ

At least eight 145.01 digpeaters have been instal-
led in the State to date: LCH, HIG (Lafayette), BTR,
SLI, MSY, AEX (testing at this writing), SHV, and
Bastrop. Hammond (HMU) is in the process of collect-
ing the needed equipment for their digi and it
should also be on the air by the time this reaches
print.

LAPRS has the State separated into seven 'major
metro areas': SHV, MLU, AEX, LCH, LFT, BTR, and
MSY), with each area furnishing one elected director
to LAPRS. Each of the areas, containing certain
surrounding Parishes, will support its own local
area network (LAN) of digipeaters (on an assigned
frequency), a VHF/UHF BBS and a VHF/UHF gateway.
Each LAN will be initially linked state-wide on
145.01.

The LANS will serve specific areas of the State
for local communications and 145.01 will serve as
the first 'back bone' frequency. Eventually, this
will be moved to 440MHz for BBS traffic and 145.01
will remain in place to support LAN-to-LAN
communications.

The BTR LAN consists of the Parishes of Pointe
Coupee, Iberville, East and West Feliciana, East and
West Baton Rouge, Livingston, Ascension, Terrebone
and St. James. The assigned LAN frequency is
145.05. Each Parish can install as many digi's on
that frequency as needed. Digi's on the 'backbone'
frequency should be limited. LAPRS representatives
(listed in last months PRM) can assist other areas
in determining which 'major metro area' they are in.

The BBS will be a dual-port with one·port serving
145.05 and the other on 145.01. The .05 port will
serve users within LAN and forward mail to other
LANS inside or outside the State. Likewise, traffic
directed to the BTR LAN will be received on .01 and
available on to read on .05. Unfortunately, until
the 440 'backbone' can be established between BBS's,
users will have to share 145.01 with the BBS
whenever a user wants to work outside the LAN
frequency.

LAN frequencies have been assigned as follows:
SHV: 145.07, MLU: 145.09, AEX: 145.03, LCH: 145.07,
LFT: 145.09, BTR: 145.05 and MSY: 145.03. Some jug-
gling can be arranged if needed, but clubs or indi-
viduals planning to install a digi should check with
their LAPRS representative first.

All of these plans will take an awful lot of
cooperation amongst LA Hams. So far, each area
approached by LAPRS has expressed willingness to
cooperate and help. Membership is open to all Hams,
or non-Hams, either as individuals, clubs or fam-
ilies. Charter memberships are still available for
$30 and regular memberships for $12. A charter mem-
bership entitles the member to a subscription to
this magazine and a LAPRS patch suitable for cap or
vest. A regular membership includes the subscription
only.

Please forward all the calls of new packet sta-
tions in your area to the LAPRS at PO Box 40723,
Baton Rouge, 70835. We need all the new 'recruits'
we can find. The patches for charter members have
been ordered (at SHV hamfest) and should be in in
mid-September.

I am filling in for NE5S this month while he
vacations in the 'wild west'. Until he lets me do it
again, 73 - de Jack, WD5ELJ.

- PRM -

BATTERY BACKED RAM

Patrick J. Fagan - WA5DVV
President - MARDA

JACKSON DIGI:

The good news from the capital is --- Jackson now has a dedicated wide area DIGI on the air! JAN is at a temporary location presently bu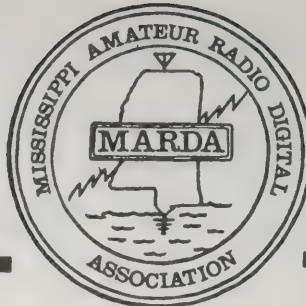t is able to reach K5HYE in Mendenhall and VKS in Vicksburg. Welcome to Rod, KA5AGD, in Clinton. He has a new AEA PK-232 all mode digital controller on the air. What a way to get going on Packet!

VICKSBURG TO BASTROP:

VKS has a marginal link with BQP in Bastrop, LA at this time but work is being done to improve the path. BQP is on a CATV tower in Bastrop with the antenna mounted on the northwest leg. Coverage to the west and north is excellent but a null exists at the River Town. Minimal power has to be maintained at the digipeater site so as not to interfere with Cable Channel E. Pat,N5BSL, points his beam toward Vicksburg and uses his TNC with an alias of "BSL" to augment the path to BQP. The link is about 50 to 60 per cent in the daylight hours but approaches 100 per cent at night. Listen for new activity from that area very soon.

LAUREL DIGI FINDS PERMANENT HOME:

The Laurel Amateur Radio Club has recently placed LUL at a new site. This DIGI is now 150 feet higher than the former location. Signal reports from the north show an improvement of at least 20 db. That's the good news ... here on the coast the signal seems to be less than the RF level radiated from N5DWU's home station. Sometimes you gain in one direction and lose in another. I guess that is what makes amateur radio such a challenge. LUL was previously operating from N5DWU's QTH in Ellisville. Steve is also SYSOP of the Laurel/Hattiesburg PBBS.

CRESCENT CITY BBS WELCOMED:

Harry is the new SYSOP at the WB5BZE BBS in New Orleans. He is running the WA7MBL software and will be shifting back and forth between 145.01 and 145.03 (New Orleans LAN) for message forwarding. Harry has developed a system for the TAPR TNC-1/ICOM VHF radio combo that will allow a frequency change during a certain predetermined 'window' for early morning forwarding of messages. His system moves from .03 to .01 after midnight and then back again after 6 AM local time. Sounds like a super setup. Maybe we can talk him into writing an article for PRM (HINT - HINT). The addition of the WB5BZE BBS has made a tremendous difference in throughput from the MS to LA area. BBS DXing has been reduced considerably.

PORT CITY PACKET:

The Mobile Amateur Radio Club is just about ready to put on their 440 DIGI. Terry, NN4Y, and Mike, KB4JHU, have been working on this project for quite some time now. Antennas have been installed and a decision is being made on whether to purchase a commercial two port unit or roll their own. When this system is installed it will complete the initial phase of the MARDA/ALANET backbone link from Alabama to Mississippi. The path from Mobile to Crestview, FL has yet to be improved. A DIGI in between? That looks like the next step. Lets get the dialogue flowing packeteers. Sounds like a joint project that would benefit all the amateur radio clubs in these areas. A shared investment and unified group effort can make it happen!

LIGHTNING STRIKES - DIGI DIES:

KO5S-1, the new DIGI in Ackerman has bit the dust. This complete system was installed in aweatherproof housing and mounted at the 800 foot level on a TV tower. Lightning got the computer grade power supply on the first hit. That was repaired and the digi returned to the air. Then lightning made its second attack and glitched the TNC. The Kantronics unit being used did not have a watchdog timer so it locked up on the air. Its difficult to climb a tower to the 800 foot level and reset the TNC in the middle of a thunderstorm. By the time the shower dissipated, the radio transmitter literally burned up. Plans call for the installation of a TNC-2 type unit when the system is rebuilt. We are all sorry to learn of this unfortunate happening. Tower mounted digipeater systems have their advantages but the summer thunderstorms in Mississippi really reek havoc on these electronic marvels.

MCARA HAM/SWAPFEST FEATURES PACKET FORUM:

The Mississippi Coast Amateur Radio Association's annual Ham/SwapFest will be held at Point Cadet Plaza in Biloxi on Saturday and Sunday, October 4 and 5. This will be an outstanding event and a full schedule of activities have been planned. Jon Bloom, KE3Z, ARRL Laboratory Supervisor will be the featured speaker at the Packet Forum and MARDA Statewide meeting at 10:00 AM Saturday morning. This information failed to make it in the HamFest flyer or announcements column in other magazines. Please give it widest distribution so that all will have an opportunity to hear Jon speak. He will also be available after the forum at the MARDA booth. New equipment displays, BBS Q & A session, LAN reports, BACKBONE interfacing with MARDA, ALA-NET and LAPRS, Dual Port TNC progress, and many other topics will be discussed. Over sixty packeteers attended the forum last year and we anticipate double that number this year. If you are within a three state area this is one HamFest you won't want to miss. Make plans to bring the entire family for a weekend vacation on the Coast. Talk-in on 144.73/145.33 repeater.

Until next month, may all your CONNECTS be many and RETRIES few.

- PRM -

FADCA > BEACON

THE FLORIDA AMATEUR DIGITAL COMMUNICATIONS ASSOCIATION

WRITE ONLY MEMORY
Ted Huf, K4NTA

The FADCA Packet Frequency Coordination Committee met at Clewiston, FL on August 24th in the morning before the Network meeting. Committee members present were K4GFG, WB4KGY, K4AHO and K4NTA. It was reported that many of the digipeater operators had not sent in their registrations. The FADCA PFCC is charged with the responsibility for coordination of digipeaters in Florida by the Florida Repeater Council. We cannot do our job without these registrations.

The ARRL filing deadline for the repeater direc- tory is about November 1. The PFCC decided to supply the ARRL with a list containing only those digipeaters that are coordinated (registered), and to list the calls without the area code prefix. If you are a digipeater operator or trustee, please contact FADCA for a registration form and send it in as soon as possible.

I wish to thank our host at the Melbourne Hamfest this year. Packet radio was present with a booth and a spot on the program for a presentation. Howie, N2WX, hosted a panel Q&A session that I think went very well. It was interesting that about half of those attending had never operated packet. There were a lot of questions about how NTS traffic could best be handled and about BBS operation.

PRM

RECEIVED FROM W4NVC VIA PBBS
*** TNC HANG UP ***

FOR THE SECOND TIME THIS WEEK, THERE HAS BEEN A STEADY TONE MODULATED CARRIER ON (03)...EVIDENT THAT SOMEONE'S TNC HAS HUNG UP IN A KEY-DOWN CONDITION... IT SEEMS TO BE HAPPENING TO KANTRONICS ESPECIALLY..I HAVE ONE, AND HAVE HAD MINE HANG UP A COUPLE OF WEEKS AGO...HUNG UP FOR 7 HOURS!

THE TAPR UNITS [AND THEIR CLONES..ED] HAVE A BUILT IN TIMER,...OTHERS DON'T! AFTER DISCUSSING THIS WITH THE KANTRONICS PEOPLE VIA LANDLINE THEY DENY THAT THIS IS A COMMON OCCURRENCE, HOWEVER, THEY DID PRO- VIDE ME WITH A CIRCUIT FOR A "WATCH DOG TIMER" THAT CAN BE ASSEMBLED FOR COUPLE OF DOLLARS WHICH WOULD GIVE A MEASURE OF PROTECTION (GRIN). I RECOMMEND THAT ANYONE OPERATING A TNC IN AN UNATTENDED CONDITION AS MINE IS MOST OF THE TIME, SERIOUSLY CONSIDER BUILDING UP THIS SIMPLE CIRCUIT.....I'LL BE HAPPY TO PROVIDE ANYONE WITH THE CIRCUIT IF INTERESTED....IT COULD SAVE YOU AN EXPENSIVE MELT DOWN OF FINAL TRANSISTORS AND POWER SUPPLY..

LEAVE MESSAGE ON MY BBS OR KB7TV-1..DE BILL SK

PRM

PACKET AND THE COMMODORE 512?
Chuck Harrington, WA4GPF

Yes, it's true! The successor to the C-64 is now available; it was dreamed of and designed by many of the people involved in the original C-64 and VIC20s. Like its predecessors, it is an exceptional computer value. The new 512 computer is affordable, and yet extremely powerful. As its name suggests, it comes with 512K RAM standard. It features a new 68000 32/16 bit CPU running at 8 Mhz, and has a full complement of standard printer and serial ports. Although it won't run your old C-64 software, it comes with a free word processor and other good software to get you started. A packet terminal program is also now available, free of charge, from the author.

Commodore 64 users, please read on! The above paragraph is all true, except for the name of the computer, which is in fact the Atari 520 ST. Many of you C-64 users have not been reading this column, because you saw the word Atari, and since you did not have an Atari, you turned to the next page. Many of us do not have the time to keep up with the happenings in corporate America, and are therefore unaware that Jack Tramiel and some of his best people left Commodore over two years ago and formed "THE NEW ATARI CORPORATION", so that they could continue to develop computers with the value of the C-64.

I was fortunate to be able to exhibit the 520ST running PACK-ET-TERM, my packet specific terminal program for the ST, at the FADCA booths at both the Jacksonville and Melbourne hamfests. Several people came up to the table during those weekends, impres- sed by the power of the ST and aggravated that they had just spent the equivalent amount of money for a Commodore 128, when they could have had an ST! For those of you who are happy with your Commodore 64s I say GREAT; you have a good value! But I become alarmed when I see people attempting to "upgrade" to a C-128; which may in fact not be too much of an upgrade.

The plain fact is that most Commodore 128 owners are running their 128s in C-64 mode, unable to take much advantage of the 128's additional capabilities. This is because software developers learned a long time ago that it makes more sense to develop their products for the C-64 mode, because then both C-64 and C-128 owners can utilize them. With the reintro- duction of the Commodore 64 as the 64C model, Commodore has reconfirmed its intentions to support the C-64, which is in fact Commodore's bread and butter product. This is all fine and good if you are a Commodore 64 owner, but for the C-128 owners, it most likely will mean the capabilities of your C-128

FLORIDA NETWORK
COORDINATING MEETING
Clewiston, FL - August 24, 1986

The southern section of the Florida Network Coordination Committee was held in Clewiston on August 24th at Tony's Glades Restaurant.

There was an announcement that Pac-Comm was coming out with a dual port digipeater board. The cost was said to be low. It will be offered in a single port version as well for plain digipeaters. All I/O will be with feed thrus. It uses the Zilog 8530 SCC and 7910 World Modem chip. It has no terminal port but you could pull the back cover and plug in a adapter board and a terminal for parameter programming. It will have modem disconnects so that high speed modems can be interfaced later. There will be a CPU watchdog and PTT timer on each radio channel.

Joel Kandel, KI4T, reported that K4TKU is having a hard time getting though Broward County on 145.03. The digi in Ft. Lauderdale is off the air a lot. Henry WA4HXZ is going to try to get one up on 03 in Delray that might help. Henry went on to report that in West Palm Beach W4PHL/WPB is operational at the County EOC on 145.01 and WPB is on 145.03 from a tower in Riviera Beach.

Bob Jankuv, WA2HFA, reported that BCR (145.01) has moved to a better site. They have antenna and some equipment for 220.

A discussion was held about the compatibility with AX25 level 2 dual port digipeaters and N2WX's new software for dual port GATOR 2 switch code. The AX25 Level 3 protocol that Howie is using with the new GATOR software works fine with Level 3, in fact, it uses Level 2.

Tom Kneisel, K4GFG, is working on a new dual port digi using a TNC-2 clone and dual port board from the fellows out in California. It will be at Plantation (PLA). He has the 220 radio, antenna at 60 feet and the two meter radio. Tom also talked about the California version of the KE3Z dual port digipeater software and how the addressing differed from the original. He pointed out that as far as he knew, neither version contained a means for identification like the TNC-2's HID and MYALIAS. The California KE3Z code is available for the TNC-2 with adapter board and the Xerox 820 with FAD Board. The original KE3Z code runs on an 820 with a state machine.

Rick Mixon, KB4CIA, reported that his BBS is off the air until it is replaced with a PC clone. His 820 bit the dust. W4DPH has replaced KC2FF as the BBS for the Tampa Bay area.

Gwyn Reedy, W1BEL, said that TPA is using only a 30' antenna since a storm his about a month ago.

Jim Diggs, K4AHO, spoke on activities in the Orlando area. The Orlando Amateur Radio Club has agreed to support a 220 digipeater located at Lake Wales. The Lake Wales site is an excellent one with a commanding "view" of Central Florida. It is expected that this site will link the East and West coast of the state. Jim says to look for Lake Wales to be on the air in late October. He reported that Orlando is still using 05 with a digi and dual port bbs. Jim's BBS observes quite hours from 7-11pm on 01 but is available all of the time on 05.

The next meeting of the Network Coordinating Committee, Southern section will be in Stuart on the third Sunday of January.

– PRM –

ELT SEARCH MISSION
Joel Kandel, KI4T

On Saturday morning August 23rd, two meter packet radio played an important role in locating an emergency locator transmitter (ELT) in the Florida Keys.

KI4T in Miami received a telephone call from K9CQ, a Civil Air Patrol officer, informing him that the Search and Rescue Satellite (SARSAT) had heard a beacon on 121.5 somewhere in the vicinity of Sugarloaf Key. He asked KI4T if he could reach Key West on packet, 150 miles distance, and ask the amateurs down there if they could monitor 121.5 and to verify the beacon.

A single digipeat through PTK in Plantation Key connected KI4T with K4OFG in Key West. K4OFG is the telecommunications officer for Monroe County.

K4OFG called Key West Center, who requested commercial airliners overflying Key West to listen for the beacon. The name and phone number of the Key West fixed station operator was sent via packet to KI4T who relayed it to K9CQ.

A Coast Guard plane was dispatched and the ELT was soon located in a small plane sitting on he Sugarloaf Airport runway. A faulty switch on the ELT had set it off.

This incident points to another valuable use for packet radio. The accurate transmission of names and phone numbers as well as the ability to link and digipeat across large distances makes it a perfect tool for search and rescue.

– PRM –

SYSOP MEETING
The FADCA TAMPA LAN is hosting a meeting of packet BBS SYSOPS in conjunction with the Florida Gulf Coast Amateur Radio Council Hamfest held in St. Petersburg October 18th and 19th. The meeting will be held at 0900, Sunday October 19th in the seminar area of the hotel. The LAN will provide free tickets to the traditional Saturday evening hamfest dinner for all participating SYSOPS.

– PRM –

FOR SALE

Kantronics KPC-2400 used less than one hour. Mint condition with warranty card. $275 Andy, KC2FF (813) 796-3477.

FIRST COAST

AMATEUR PACKET ASSN
Jack Driskell, KB4B

The second day of the Greater Jacksonville Hamfest, August 10, marked the end of the charter membership period for this northeast Florida, southeast Georgia packet group. With five new members joining up at the hamfest, the total is now 23. A very active packet booth manned by FADCA and FCAPA folks got plenty of attention at the hamfest. Bob, WD4BIW, FCAPA president, seemed to be talking almost nonstop. Chuck, WA4GPF, demonstrated his triple split screen packet terminal program for the Atari ST. Very impressive. Ted, K4NTA, Gwyn, W1BEL, George, WA4BRF, and Chuck, WA4GPF, were among the more distant travelers.

With packet gear for sale at several of the commercial booths, several new calls were heard before the weekend was out. Ed, K4YNK, Red, N4KBD, Larry, AA4JI, Mike, N4EPD, Mike, NF4L, and Rob, AA4JH were among the new calls printed.

Facilitating operations in the JAX LAN we now have JAX-1 as a centrally located digipeater at the American Red Cross HQ on Riverside Avenue. The new digi is working fairly well but some antenna and feedline improvements are still in order. JAX-1 will make it easier for stations around town to reach 904JAX which is about 25 miles west of town.

Many of the packet people went to dinner at Ryan's Steakhouse where discussions were lively and varied. Another contingent of packeteers opted for seafood and headed for Red Lobster. Topics of conversation included FCAPA budget, now only $50 in the hole, virtual terminal formats, binary transfer protocols, and real time versus BBS type packet operations.

This last topic warranted considerable discussion. There seems to be a growing tendency for packet operations to favor BBS type contacts over real time connections. It is clear that bulletin boards have brought a considerable convenience to the mode, but many of us greatly enjoy the fun and excitement of talking to someone live. Bulletin board messages are great when you cannot reach the operator you want to talk to, but it is something like calling someone's house and reaching an answering machine. The answering machine will facilitate communications but cannot replace the two way real time conversation. One case in point is the use of bulletin board systems in Georgia through the middle of the state. A year ago it was possible to connect from Jacksonville to Atlanta with fair conditions. Today it is hard to tell that anyone is in Georgia, except around Augusta and Savannah.

The Georgia LANs are accessible through bulletin board gateways only. The bulletin boards allow connects on the network side only from other bulletin boards. Although someone in one of these Georgia LANs can connect to someone else via gateway, anyone outside of the system can only send a BBS message, no real time connect is possible. Perhaps all of this is a temporary measure to serve as a stop gap before more sophisticated linking is established, but we miss seeing those Georgia calls here in the Jacksonville area. Bob, WD4BIW, among others, has reached as far as Lynchburg, VA using Savannah and Augusta as digipeaters.

Many of us spend most of our working time doing something with machines, it will be a shame if our packet time becomes more oriented toward machines than people.

– PRM –

NEWS

FROM THE MELBOURNE LAN
Bill Newkirk, WB9IVR

Florida winners of a scholarship granted by the Foundation For Amateur Radio, College Park, MD, are:
-- Dade Radio Club Tropical Hamboree Scholarships ($500) -
    David R. German, N4FAD, Sarasota, FL
    Todd E. Wiggins, KB4BDK, Marianna, FL
-- Edwin S. Van Deusen Memorial Scholarship ($350) -
    David P. Tancrell, KB4GIA, Palm Bay, FL

Area Code 305 will be split into 2 areas in April 1988. The area around Miami/Ft. Lauderdale will continue to be area code 305. The remaining area will become known as area code 407. This was necessary because Southern Bell was running out of phone numbers. The change is expected to handle the regions growth until the turn of the century.

– PRM –

AIR FORCE MARS ON PACKET
Steve, N4GXX/AFA2WG

The authorization of packet radio operation is limited to TVRS frequencies (advance techniques nets) except 6-meter 49.98 MHz. Packet is also allowed on simplex VHF frequency 143.950 MHz, providing the frequency is currently cleared and authorized for use.

– PRM –

NOTICE

TAPR TNC-1, AEA PKT-1, and Heath HD-4040 owners. Version 1.1 of the 'WA8DED' packet software is available, and Ron Raikes, WA8DED, has corrected some minor bugs from version 1.0. Just send a set of EPROMS and some return postage to: John Moore, W5HUQ, 548 Clermont Ave. S., Orange Park, FL 32073.

– PRM –

PACKET VOICE NETS

Florida State-Wide - 3958 kHz Sunday 8 AM
Southnet Coordination Net - 7190 kHz Sunday 2 PM
Tampa Bay Area - 147.165 mHz Sunday 7:30 PM
Brevard County - 146.850 mHz Sunday 8 PM

Please drop K4NTA a message with corrections or additions

ICOM IC-22S
FREQUENCY COVERAGE MODS

Elmer A. Wingfield, W5FD
26 Belmont Drive
Little Rock, AR 72204

The ICOM IC-22S Phase Locked Loop synthesized FM amateur transceiver covers 146-148 MHz in 15KHz increments. This radio may be made more useful for amateur packet radio users by a simple modification to change the frequency coverage to 145-147 MHz so that it will operate on the popular packet simplex frequencies of 145.01 - 145.09.

All that is necessary is to change the X2 local oscillator crystal from the present 44.563333 MHz to a frequency of 44.230000 MHz. The crystal is a third overtone type and is located on the VCO/PLL board. After installation of the new crystal, the frequency should be trimmed by adjusting C38 to give a transmitter output frequency exactly one MHz less than the programmed value. A good frequency counter should be used for this adjustment. This applies to either the VIP switch frequencies or the original IC-22S switch diode matrix programmed frequencies. The duplex or simplex or VIP-15 or VIP-600 switch operations remain the same as before modification.

The local oscillator output frequency to the IC4 mixer will be 132.69 MHz after the new 44.23 crystal is installed, one MHz lower than the original 133.69 MHz. The VCO output frequency to the IC4 mixer will be 1 MHz lower for the same N divider count, and the transmitter output frequency will also be 1 MHz lower (F_{out} = VCO + 10.7 MHz.) Although the VCO operating frequency is shifted 1 MHz lower it has not necessary to adjust the L7 VCO slug in either of the two IC-22S units that have been modified. Should PLL lock fail in the range of 145-147 MHz then set the programmed frequency as near to the new frequency of 146 MHz (N = 174, old frequency 147) as possible and adjust the L7 slug to center the PLL lock-in.

If desired, the Q17, Q18 and Q19 trimmers may be readjusted for maximum power output using an in-line or terminating wattmeter to a 50 ohm dummy load. C100, C87, C92, C91, C85, and C81 are also to be peaked for maximum power output.

I used a crystal for this modification from International Crystal Mfg., Inc., 10 North Lee, P.O. Box 26330, Oklahoma City, OK 73126-0330. It was part number (code number) 471260, 44.230000 MHz, 3rd overtone for use in ICOM IC-22S Q7 local oscillator circuit, and the cost was $11.00 postpaid. I recommend this crystal source because their experience in providing these crystals to me make it more likely that the crystal you receive will adjust to the required frequency. The crystal supplied is a commercial grade unit.

It would be possible to install a crystal socket at the X2 position and use a plug-in crystal to allow easy return of the radio to its original condition (or to make future modifications easier.) If you take that route, change the code number on your order to 471270 and include the rest of the information given above.

See the diagram for the diode matrix N count versus frequency relationship before and after modification.

X2, ORIGINAL = 44.56333 MHz, 3rd OT

Band coverage 146-148 MHz

$f_1 = 3 * 44.56333 = 133.69$ MHz

$N = \dfrac{f_0 - 144.39}{.015}$ $f_0 = 144.39 + .015N$

X2, modified = 44.23 MHz, 3rd OT
Band 145-147 MHz

$f_1 = 132.69$ MHz

$N = \dfrac{f_0 - 143.39}{.015}$ $f_0 = 143.39 + .015N$

$f_0 = $ VCO + 10.7 MHz (operating freq.)

$f_2 = 1.62$ to 3.60 as N = 108 to 240 (both)

$f_2/2N = 7.5$ kHz to PLL Detector/Filter

– PRM –

News and Views continued from page 14

TAPR has established an associate membership which does not include the PRM subscription for those who receive the publication from another source. I highly recommend continuing support of TAPR.

FADCA has not established an associate membership class. Dual TAPR/FADCA members are encouraged to retain FADCA membership and associate TAPR membership, thus continuing to support both organizations. The rates charged for supplying PRM to participating clubs include a small amount to compensate for the loss of FADCA renewals because of the transfer of memberships to the local organization.

The PRM concept of a common club publication is designed to strengthen and support the growth of regional organizations. If there is a participating club in your area, join it and you will be supporting both local and national groups. If your local group is not participating in PRM, make them aware of the opportunity at the next meeting.

ARTICLES

Good quality photographs and articles are needed on a regular basis to make an interesting magazine. Please send your contributions to the FADCA address. Good thorough reviews of packet equipment and software are needed. I prefer reviews that emphasize facts and direct experience with a product. It takes a lot of homework to learn enough about a product to give it a proper evaluation. Reviews in some magazines tend to tell more about the bias or lack of experience of the author than they do about the product. I sure don't mean to scare any potential contributors away, but we are not looking for 'pan jobs.' Manufacturer's new product announcements will be published for your information, and will be identified as such.

– PRM –

PACKET RADIO MAGAZINE QUICK INDEX

January 1986

"A Briefcase Station" – Portable packet using Radio Shack model 100 and TNC-2

"Model 100 / TNC-2 Clock - A Timely Program" – use the Model 100 to reset your TNC's system clock.

"SAREX-II Test Flight" – Report on a test of software that was to be used on an upcoming shuttle mission, test took place over Florida in private airplane.

"Gator-2 is Here!" – A report on working networking software written by Howard Goldstein, N2WX

"Gator-2 PAD Survival Sheet" – How to use the network switch.

"Using the IC-27/37/47 on Packet" – Tips on how to pull clean audio unsquelched from the discriminator.

"Plug in TNC for PCs" – HAPN TNC on a plug in card for your IBM PC or clone, what it is and how to get.

February 1986

"PAK-COMM Version 1B: A Review" – product review on a terminal program.

"File Transfer Protocol For Packet Radio" – from the packet data library on Compuserve.

"What is a Packet ?" – An introduction to packet, learn what is in a braaaaaaap.

"Florida State Packet Digipeaters" - A centerfold !

"1985 FADCA > BEACON INDEX" – Index to another years worth of good packet info.

March 1986

"Model 100 Terminal Program For GLB-PK1" – prevents the problem of keyboard interrupts interfering with packet reception, written in BASIC.

"More on 85-105" – A rundown of PR Docket No. 85-105.

"Pictures" – Another centerfold ! Photos of Fifth ARRL Amateur Radio Computer Networking Conference, see the faces behind the names of many articles published in packet publications.

"What's in a Layer ?" – beyond level 3 networking

"A Proposed Level 3 Routing Algorithm" – More on level 3 networking

April 1986

"Steam Powered Packet Radio" – Packet on a choo choo

"Notice To All TAPR/Clone HF Packet Users" – How to improve HF packet reception.

"Auto Answer For the TRS-80 Model 100" – a BASIC program for the Model 100, a mini BBS mailbox system.

"What's in a Layer ?" – the saga continues... why layer 3 is not linking.

"BBS Compatibility" – The transition from Xerox based WORLI to PC-clone based WORLI code.

"Dual-Port Digipeaters,K9ng Modems and FAD Boards" – Lots of good info on FAD boards, 9600 bps modems and Midland radio mods.

May 1986

"EZ-Packet 80: A Review" – A review on a terminal program for the TRS-80 Model 1,III,4.

"A Bare Bones Dual - Port Digipeater" More on multiport digipeaters and how they relate to networking.

"Cactus Corner" – Although in every issue, this month Lyle Johnson gives a frank review of the many different TNC's on the market.

"Computer Networks" – Forget what's in a layer, what the heck is a layer, this is where you can find out.

"Review of the AEA HF Packet Modem, Model PM-1" – The title says it all.

"Southnet" – What is it, where is it, who is it?

"Connect - The Beginners Column" – Just the basics needed for first timers or a reminder for old-timers, gets you on and off WORLI BBS system.

June 1986

"Cactus Corner" – A look at the new Kantronics PK-232 2400 bps modem.

"Computing Across America with the Winnebiko" – an interesting look at a high tech bike that sports a packet radio station.

"Atari 520ST" – A new column dedicated to the Atari 520ST

"Eliminating POOP from Packet" – Probably needs no introduction, this article has been around.

July 1986

"Homebrew Packet" – Progress report on several on going software projects of Howard Goldstein, N2WX

"Packet on the Atari ST" – More on the Atari 520ST.

"WORLI Work-alike for the C-64" – Information on a new BASIC program for the C-6 that operates almost like a WORLI BBS.

PIN DIODE SWITCH FOR
RELAY SWITCHED RIGS

Jeff King, WB8WKA
Reprinted from Packet Express

The following circuit will keep your relay switched rig in pace with your TNC. The circuit can be used to replace the relay in your rig. This will improve packet turn-around time by a great deal.

PRM Index continued from page 23

"Connectionless Emergency Traffic System" - A realtime message delivery system for use under emergency conditions, written for the C-64.

"TNC-2 Dual Port Digipeater" - How to make your one TNC-2 act like two TNCs.

"Computer Networks" - This is a continued discussion of what a layer is.

"Packet Beeper for TNC-1 Clones" - A connect status indicator circuit.

"Bouncing Packets off the Moon and Other Topics of Lunacy" - EME and packet for those who like to step beyond.

August 1986

"Cactus Corner" - A NNC update and more on 2400 bps packet.

"Packet and the Atari ST" - A review of PACK-ET-TERM, a terminal program for the ST.

"An Update on the Connectionless Emergency Traffic System" - Updates and corrects a previous article on CETS.

"Frequency Agile C-64 BBS" - More on the WORLI look alike BBS written for the C-64.

"Hamilton Area Packet Network Notes" - HAPN has been running tests with 4800 baud on 145.65, read this and find out what's going on.

"Kantronics TNC Mods to Improve Packet Copy" - How to fix the push to talk circuit of the KPC so it doesn't interfere with your Icom HT or solid state relay type rig.

– PRM –

Commodore 512 continued from page 19

computer will not be supported by developers. It is for these reasons, I request that you C-64 users take a close look at the Atari ST computers, before you decide to trade your C64s for C-128s.

The 520 ST is in the price range of the Commodore 128, and can offer the C-64 owner a chance to really upgrade to a very powerful and flexible computer system. The fact that you will need new software, need not be the major consideration; free software fills the memory banks of the ST phone BBS systems, and you will soon have all kinds of software that is far superior to the old stuff you left behind. Also, many of the professional developers who previously wrote for the C64, are now developing for the ST, and there is a wide variety of commercial software products available today!

Among the free programs available is PACK-ET-TERM, which is now being distributed in version 3.1a. It was found that version 3.0 BETA, would not properly run on the one megabyte STs, and so I have made the first upgrade to the program. PACK-ET-TERM 3.1a comes in two versions, one customized for TNC-1s running the WA8DED software, and a TAPR version. You may obtain a copy of PACK-ET-TERM by sending a check for $4.00 to cover the cost of the disk and shipping to: Chuck Harrington, 5634 Lesser Drive, Orlando, Fl. 32818. You may also call the McDonald Development BBS at (305) 886-1632 and download the files. The FADCA software library currently has no way to duplicate ST disks, so unless you can get a copy from a friend or BBS, I am your best source.

I enjoyed meeting and talking with many of you at the hamfests, and would like to thank you for your ideas and support of PACK-ET-TERM. I am interested in hearing from users regarding any problems that they have experienced with PACK-ET-TERM, and shall appreciate any suggestions I receive for improving the program. Also, my special thanks to Bob, WD4BIW, and Howie, N2WX, for the help and hospitality given me at the hamfests.

Next month, a look at the ST and other possible applications for it in packet radio. Until then, may your Retries be few!

– PRM –